C. K. Hampshire and C. E. G. Hawker, in "A Note on Vitamines: A Suet Emulsion for Infant-feeding," describe the preparation of a substitute for cream, which proved to be palatable and well-tolerated by infants.

Other papers contributed were "A Note on Japanese Chiretta," by V. Cofman; "Note on Tinctures of Iodine," by F. Burrows and H. Droop Richmond; and "The Examination of Valerianates," by H. Droop Richmond and W. T. T. Ainsworth.

A MODEL OF THE VOLCANO KILAUEA, HAWAII.

MODELS of land-forms are not new, but the art of reproducing the features in a naturalistic way without exaggeration of the vertical scale has not been attempted until recent years. A. Heim, of Zurich, was a pioneer in this work about twenty years ago. Mr. George C. Curtis was a student of Heim. Before attempting the difficult task of making a naturalistic reproduction of Kilauea, Mr. Curtis had made many models of note. Among the most important of these are the models of the cities of Boston and Washington, and the models of Bora Bora and Funafuti, coral atolls of the Pacific.

views had been available when the modelling was started, the work would have taken only a year and a half instead of forty months, as was actually the case. In the future the naturalistic modelling of land-forms will depend largely on kite or aeroplane views for its accurate and speedy accomplishment.

The model of Kilauea is circular in form, 14 ft. in diameter, and has an area of modelling representing about 13 sq. miles. The scale is 1 : 1500, or 1 in. = 125 ft. The sizes of the men on the edge of the Halemaumau crater, the buildings, trees, and automobiles on the roads, give a good idea of the scale. This model, like the other naturalistic models of Mr. Curtis, has no exaggeration of the vertical scale. For the first time in model-making a cycloramic background has been used. It gives the feeling of vastness that we should naturally have if looking from a balloon on the country below. As the observer looks downward on this model he is virtually half a mile high in the air. Those who are familiar with Kilauea assert that the reproduction is as faithful to the actual ground as it is possible to make it. Although it has been impossible to represent every tree on the ground, many thousands of trees have been made by hand and each one placed in the plaster. The details of the lavas are remarkably true to nature.

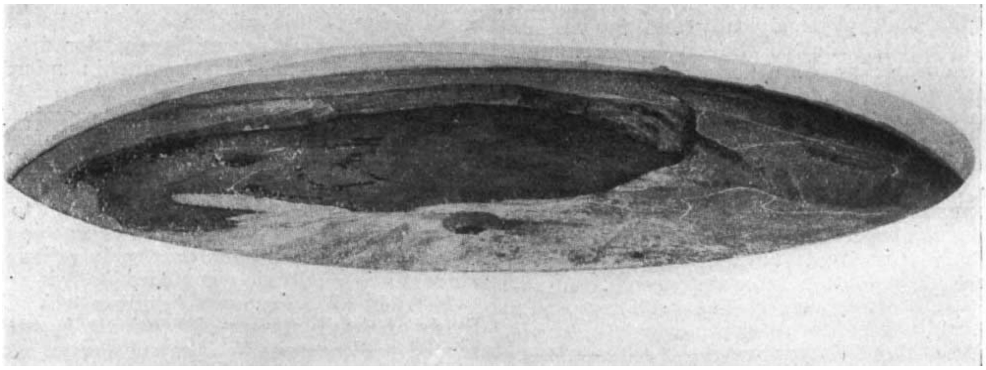

FIG. 1.—General View of the Model. The observer looks northward across the great lava sink. In the middle foreground are the extinct pit crater of Keanakakoi and the border of the Kau desert; to the right a small extinct pit crater. In the left middle distance is the active crater of Halemaumau (House of Eternal Fire). On the right of the main sink some down-faulted blocks may be seen. The Volcano House with its group of buildings is situated behind these. Note the dense forest on the left. On the right is the extinct crater of Kilauea Iki separated from the main sink by the down-faulted block of Byron's Ledge. On the left and on the cycloramic background rises Mauna Loa, 10,000 ft. above Kilauea and twenty-five miles away.

In February, 1913, the present writer engaged Mr. Curtis to make a model of the volcano Kilauea, on the Island of Hawaii, for the Geological Museum at Harvard University. Mr. Curtis went to Hawaii in March, and spent three months at the volcano, making a supplementary survey and taking panoramic photographs and colour sketches of the ground. The staff of the Kilauea Observatory, Prof. T. A. Jaggar and Mr. H. O. Wood, aided Mr. Curtis in every way possible. After the actual work of modelling had been started at Boston, Mr. Curtis found it almost impossible to reproduce the frozen lavas of the great sink of the volcano with the photographs that he had. Mr. J. Fred Haworth, a merchant of Pittsburgh, had become a master in kite-photography. He was glad of the opportunity to go to Kilauea and take kite views of the volcano, and this he finally did at his own expense. Without these views from the air it is very doubtful whether Mr. Curtis could have perfected the work undertaken. With these kite views, however, the modelling of the frozen lavas became much simplified. In waiting for the kite views the work on the model was delayed. If these

In addition to the many features of interest to the vulcanologist and the student of structural and dynamical geology, the model shows very well the effects of climatic control on the vegetation, due to trade winds and altitude. To the east and north-east of the Volcano House the forest is of a tropical nature in its luxuriance. To the west and south-west the vegetation disappears rapidly, so that on the western part of the model there appears nothing but a desert of volcanic ash. Three types of climate are shown: the top of Mauna Kea is frequently snow-covered; near the north and east coast and as far as the Volcano House is a tropical forest where the rainfall reaches the large amount of 300 in. a year; and west of the Volcano House is a desert where the rainfall may not reach 15 in. a year.

A model of this kind is expensive, and such models will never be cheap. With the use of kite or aeroplane photographs, however, the cost should be cut down by half. Museum staffs will ask the important question: Is the work worth while? Those who are qualified to answer this question have answered in the affirmative. The advantages of a good naturalistic model are many. (1) Such a model of a volcano or of any land-form which changes during a generation of men is a scientific record of that locality, of great value to students of the present and future. (2) Such

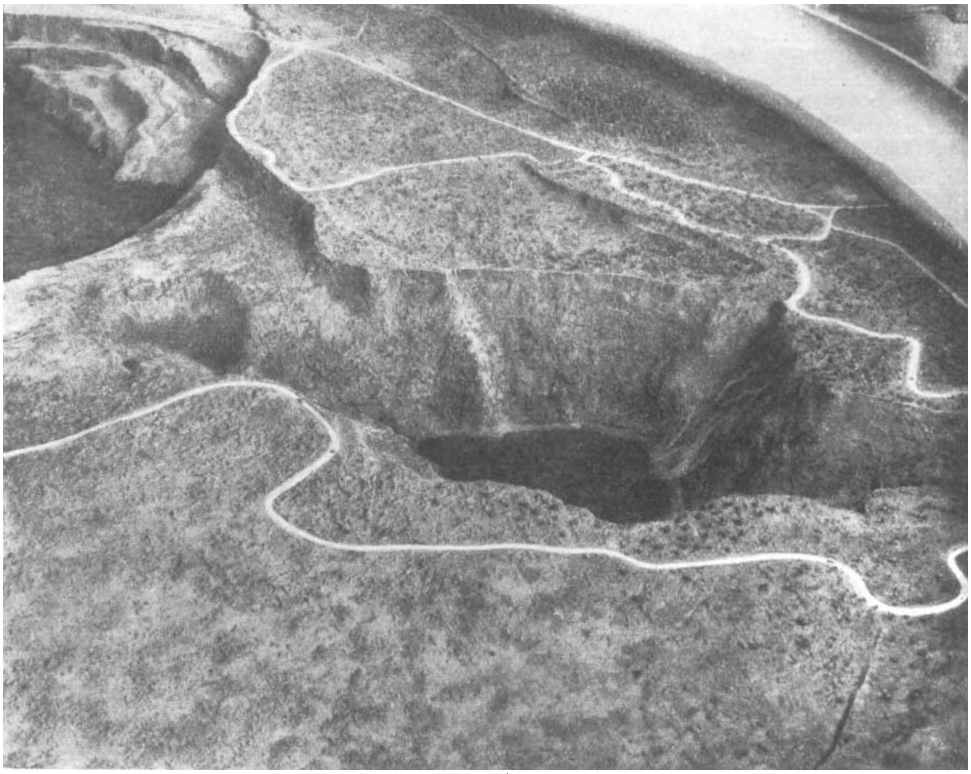

FIG. 2.—In this figure the extinct pit crater of Kilauea Iki is seen. At the bottom is a sheet of frozen lava which shows black in the figure. The level of this lava is several hundreds of feet below the lava of the great pit. There has been a flow of lava from a point midway between the great pit and Kilauea Iki within historic times which flowed into Kilauea Iki. The sides of Kilauea Iki are very steep, but partly covered with vegetation. The road may be seen winding about the rim of the crater. With a reading-glass several automobiles may be seen, which give an idea of the scale of the model.

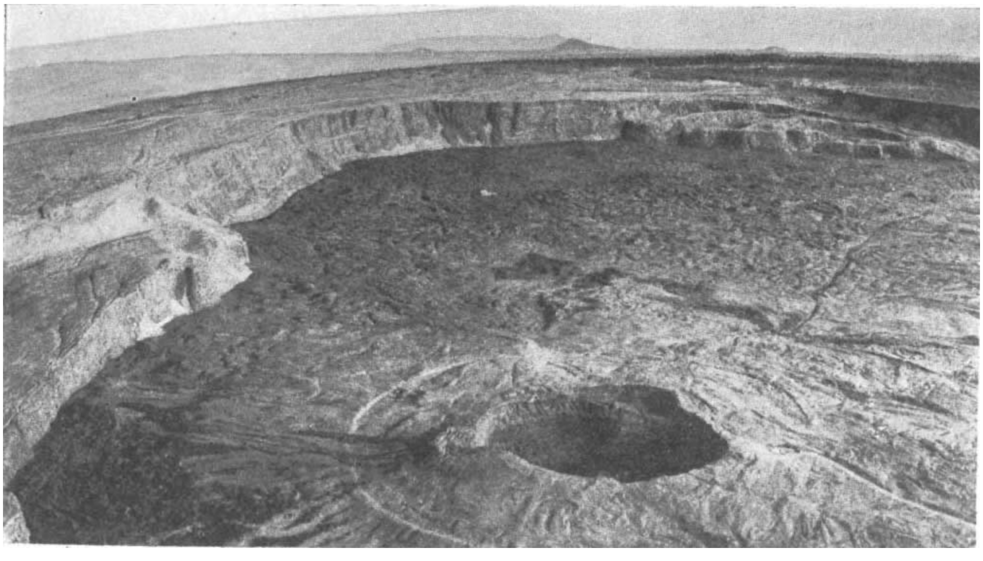

FIG. 3.—Photograph of the Kilauea model looking north-east across the pit of Halemaumau, the molten lake with its fiery fountains being just visible. The liquid lava is 350 ft. below the rim of the crater. The observation hut maintained by the Massachusetts Institute of Technology is on the left just back from the rim. Sometimes the molten lava rises nearly to the top of the pit, and again it will sink away so as to make the crater about a thousand feet deep. The dark grey lava field reaches to the base of the encircling caldera walls, in which the old bedded structures of ancient lava-flows, ash beds, and a laccolith may be observed. Taluses are seen in several localities at the base of the escarpment. In the left foreground is the summit point Uwekahuna, under which lies a stairway of great down-faulted blocks. Note the Volcano House group of buildings in the right distance, to the left of which are the brilliantly coloured Sulphur Bank and, behind, the dark forested slopes of the Kilauea cone.

models are of great value in research work. Several discoveries have been made by means of this Kilauea model. The volcanic bomb craters were practically unknown before the model was made. A young drainage system in the ash desert was also unknown previously. Prof. R. A. Daly has discovered that the land about Kilauea Iki slopes away from the crater in all directions, thus making of the Kilauea Iki area a dome similar to the area about Halemaumau. (3) The bird's-eye view of an area which can be studied at leisure reveals many relations between various features of the country which could not be well seen and studied in any other way. On account of the atmospheric conditions, no balloon or aeroplane observation or photograph could give at once such an ideal view as one obtains from the model. (4) The model can be used to teach students facts in geology, geography, and meteorology. The important things which a locality has to offer can be taught at home. (5) Such naturalistic models may be used in the teaching of landscape sketching and painting, and even in the teaching of map-making.

Although such models are worth while, the men who can make them are not easy to find. This is the real difficulty at present. Let us hope, however, that the revolution which kite or aeroplane views have made in this new art will encourage more men to undertake it. On account of the difficulty of obtaining orders for expensive models, Mr. Curtis has given up the work, and at present is farming at Willits, California. In order that the methods and technique which Heim and Curtis have gained after years of patient labour and study may not be lost, they should be described and published for the benefit of those who will continue from the point where these masters left off.

ROBERT W. SAYLES.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. S. CHAPMAN has been appointed to the second chair of mathematics recently instituted in the University of Manchester.

DR. SAMUEL SMILES has been appointed to the newly created chair of organic chemistry at Armstrong College, Newcastle-upon-Tyne.

MR. J. W. THOMAS has been appointed lecturer in the electrical engineering department of the Birmingham Municipal Technical School.

MR. E. RAWSON, recently head of the Newcastle-upon-Tyne Training Centre, has been appointed head of the mechanical and civil engineering department of the Portsmouth Municipal College.

THE following appointments have been made at the London (Royal Free Hospital) School of Medicine for Women:—Mary Lucas Keene, lecturer in anatomy, and head of the anatomy department; John W. Ebden, Lawrence Abel, Mary Hounsfield, Mary Joll, demonstrators of anatomy; Bernard H. Spilsbury, lecturer in forensic medicine and toxicology; Eleanor Scarborough, demonstrator in pharmacology; M. Ross-Johnson and D. Woodman, demonstrators of physiology.

AN announcement has been received from the Technical Optics Department of the Imperial College of Science, South Kensington, that, subject to a sufficient response, Prof. Conrady will give a vacation course of sixteen lectures on "Optical Designing and Computing." For the convenience of students living at a distance two lectures will be given on each Tuesday and Thursday from August 26 to September 18 at 11 a.m. and 2.30 p.m. The syllabus includes methods of exact ray-tracing for axial and oblique pencils and approximate methods of treating aberration problems, together with the application of these methods to a number of typical optical instruments. Full lecture notes will be supplied to students a few days in advance of the lectures, leaving the greater part of the time free for a fuller discussion of the more practical aspect of the problems than would otherwise be possible. The fee for the complete course, including an optional computing course following the morning lectures, is 2*l.*, payable to the Registrar of the Imperial College. In the case of students who have taken certain previous courses the fee is reduced by one-half. It is particularly desired that names should be entered well in advance.

THE *Times* correspondent at Cape Town, in a message dated July 31, states that the Development Committee of the University of Cape Town is issuing a scheme of development which involves an expenditure of 525,000*l.*, of which 200,000*l.* is for buildings at Groote Schuur, 100,000*l.* for scholarships, 25,000*l.* for a library, and 200,000*l.* for general endowments. We learn from the same source that the Prince of Wales, as Chancellor of the University, has sent the following letter to the Vice-Chancellor:—"I wish, as Chancellor of the University of Cape Town, to assure you of my cordial support in the movement to improve the financial position of the University. The coming generation is called on to restore and rebuild the world. Failure in that task would imply that the sacrifice of those who fell in the war had been fruitless, and failure cannot be contemplated. Success depends on energy, goodwill, and, above all, on the spread of knowledge and of right thinking. The universities of the world can exercise a most potent influence on this great work of reconstruction, and it is because I feel convinced that a sacred duty to help in this work rests upon our University that I appeal confidently to its friends in South Africa and elsewhere to equip it, of their generosity, with the means worthily to do its part."

THE province of the engineer has in modern times become so amplified that the great majority of young men educated for that profession are, from the earliest days of their active professional career, now brought into immediate contact with the business side of engineering practice. For this reason a widening of the basis of the education provided at our universities for engineering students has been strongly advocated in recent times. To meet the needs of this situation it has been decided by the Senate of the University of Bristol to introduce commercial courses in the faculty of engineering. Syllabuses of these courses, which are now to be compulsory, have been prepared, and are available for distribution. The scheme outlined in the syllabuses comprises instruction in four groups of subjects, namely:—(*a*) Book-keeping and accountancy, (*b*) works administration and organisation, (*c*) commercial law, and (*d*) estimating and specification writing. Two courses are to be provided in each of the subjects (*a*) and (*c*), whilst subjects (*b*) and (*d*) are to be included in both the first- and second-year courses for engineering students. The main aim to be kept in view in courses of this kind should be to bring home clearly to engineering students the real importance of the business aspects of their profession, and at the same time to stimulate their interest in this side of engineering work. The syllabuses of the commercial courses to be introduced into